

# Phylogenetic Analysis Lab

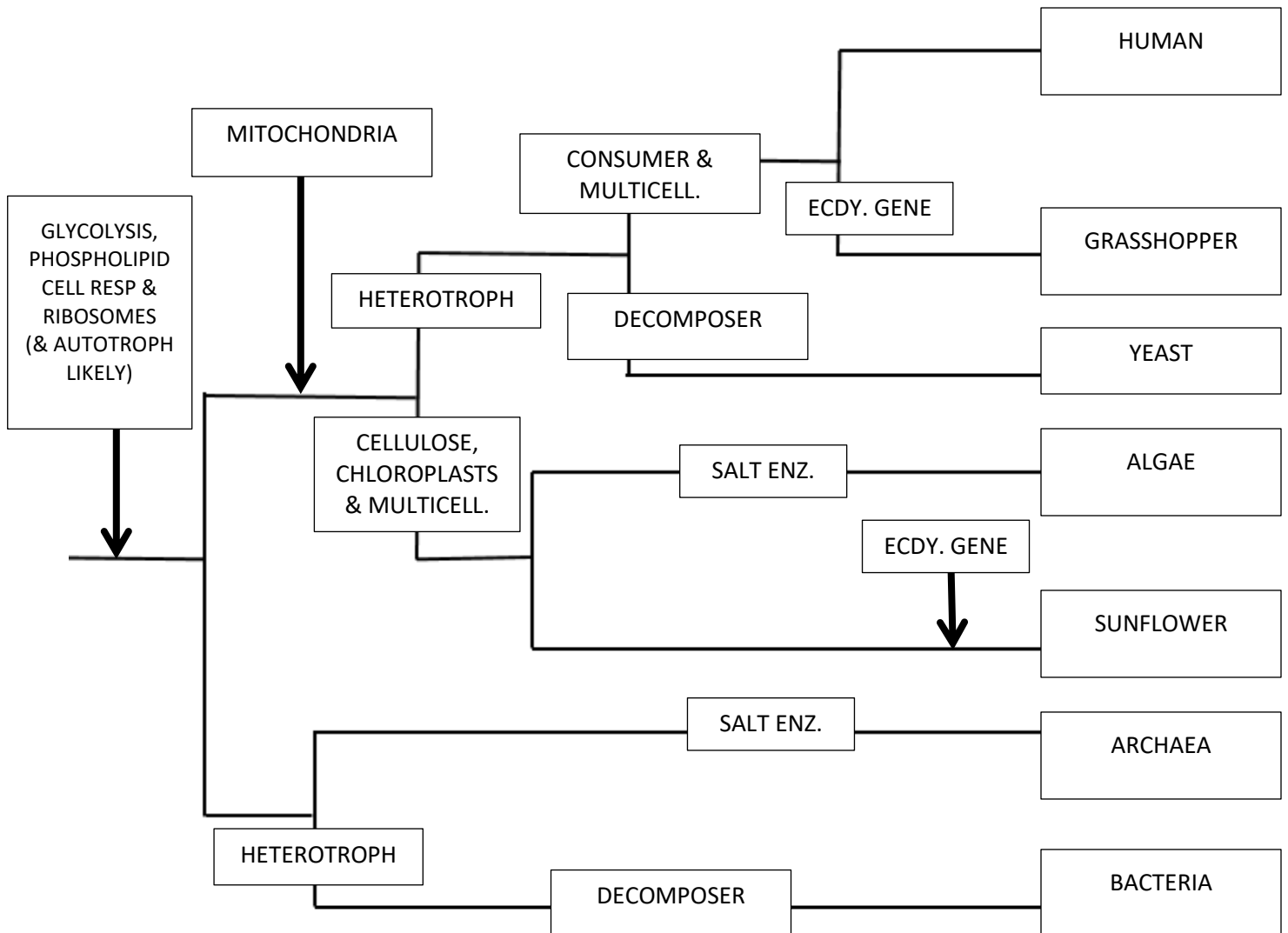
Name \_\_\_\_\_ Pd. \_\_\_\_\_

1. Review the data table below & complete the phylogenetic tree on the following page.
2. Indicate where each trait likely evolved; traits can evolve independently on separate lineages or even disappear from lineages if not favorable any longer.

	Taxa						
Traits	A	B	C	D	E	F	G
Glycolysis	✓	✓	✓	✓	✓	✓	✓
Phospholipids	✓	✓	✓	✓	✓	✓	✓
Adipose	✓				✓		
Heterotroph	✓		✓		✓	✓	
Chloroplasts		✓		✓			
Autotroph		✓		✓			✓
Multicellular	✓	✓		✓	✓		
Cellulose Cell Walls		✓		✓			
Decomposer			✓			✓	
cytoplasm rRNA sequence differences from common ancestor	58340	45989	5354	34987	57226	55854	1297
Cellular Respiration enzyme location	Mitochondrial inner membrane	Mitochondrial inner membrane	Plasma membrane	Mitochondrial inner membrane	Mitochondrial inner membrane	Mitochondrial inner membrane	Plasma membrane
Cellular respiration enzyme gene sequence differences from common ancestor	4144	4027	3654	3972	4142	4138	2300
Salt water tolerant enzymes				✓			✓
Ecdysteroid synthesis gene (An Insect developmental hormone)		✓			✓		

## Phylogenetic Analysis Lab

Name \_\_\_\_\_ Pd. \_\_\_\_\_



Complete the analysis questions on the following two pages.

## Phylogenetic Analysis Lab

Name \_\_\_\_\_ Pd. \_\_\_\_\_

### Analysis Questions

1. Using the completed cladogram & data table, write the matching letter taxon that identifies each species in the grid below.

Algae	Grasshopper	Human	Yeast	Deep Sea Vent Archaea	Sunflower	Soil Bacteria
<b>D</b>	<b>E</b>	<b>A</b>	<b>F</b>	<b>G</b>	<b>B</b>	<b>C</b>

2. These organisms represent all the major Kingdoms of life. Using the data & notes, discuss 6 pieces of evidence for unity among all life. Using the data, discuss how 2 pieces of unity evidence you listed also show diversity based on descent with modification.

#### UNITY:

**1. ALL LIFE HAS RIBOSOMES EVIDENCING OUR COMMON NEED FOR PROTEINS.**

**2.**

**3.**

**4.**

**5.**

**6.**

#### DIVERSITY:

**1. AS ANCESTOR POPULATIONS DIVERGED, CHANGES IN THEIR RIBOSOME GENES (MODIFICATIONS) WERE PASSED TO OFFSPRING (DESCENDANTS) WHICH LED TO DESCENDANTS WITH THE COMMON GENE CHANGING OVER TIME, LEADING TO HIGH DIVERSITY.**

**2.**

Name \_\_\_\_\_ Pd. \_\_\_\_\_

3. Identify & explain 3 examples of homologous features and 3 examples of analogous features evidenced in the data.

**HOMOLOGOUS:**

**1. CHLOROPLASTS IN ALGAE & PLANTS. BOTH TAXA HAVE TRAIT WHEREAS NO OTHERS DO. LIKELY DUE TO THEIR SHARING A RECENT COMMON ANCESTOR THAT HAD CHLOROPLASTS THAT LATER DIVERGED, LEADING TO DIFFERENT TAXA.**

**2.**

**3.**

**ANALOGOUS:**

**1. SALT WATER ENZYMES IN ALGAE & ARCHAEABACTERIA. BOTH TAXA HAVE THE TRAIT BUT NOT CLOSELY RELATED. THE ENZYMES LIKELY EVOLVED INDEPENDENTLY IN BOTH TAXA BASED ON ITS ADVANTAGE TO THE TAXA IN THEIR SIMILAR ENVIRONMENTS.**

**2.**

**3.**